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(71) Applicant: **MICROMAX S.p.A.**
Via Marconi, 33
I-22070 Beregazzo con Figliaro (Como)(IT)

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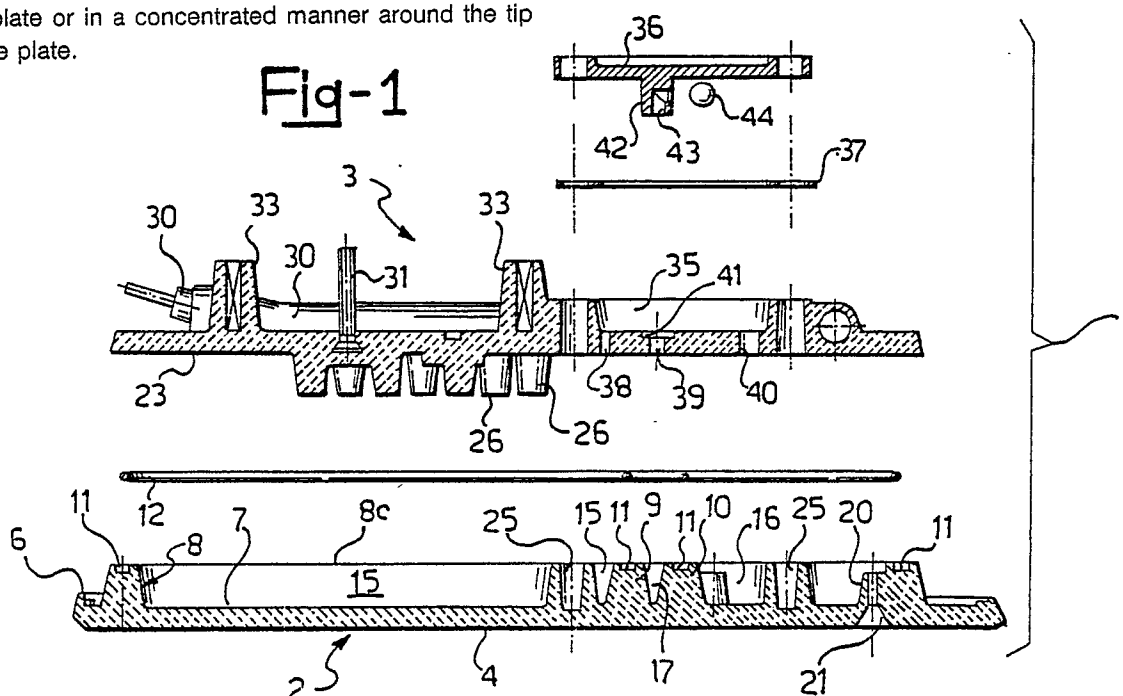
(72) Inventor: **Giannelli, Giuseppe**
Via Vignazze, 3
I-22077 Olgiate Comasco (Como)(IT)

(74) Representative: **Perani, Aurelio et al**
c/o JACOBACCI-CASETTA & PERANI 7, Via
Visconti di Modrone
I-20122 Milano(IT)

(54) **A steam delivery plate for steam irons.**

(57) The plate comprises two separate steam delivery chambers (16,17) apertured each with a set of steam delivery holes (21). The two steam delivery chambers (16,17) are in mutual communication through a delivery conduit (35) provided with an on/off valve means (44). It thus becomes possible to either deliver steam in a distributed manner across the plate or in a concentrated manner around the tip of the plate.

Fig-1



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This invention relates to a steam delivery plate for a steam iron comprising an electric resistance heater, a sole piece apertured with a number of steam delivery holes, a plurality of ribs standing on the opposite side from said sole piece, and a cover in tight relationship with said ribs bounding steam chambers and circulation conduits in cooperation therewith.

Two designs of the steam delivery plate prevail in prior irons which are differentiated basically by a different layout of the steam delivery holes, being respectively distributed throughout the plate or concentrated in an area proximate the plate tip.

The plates having their holes evenly distributed suit best the ironing of fabrics which are better served by a relatively slow penetration of the steam through their fibers, and no setting of the fibers at a high temperature.

On the other hand, plates having their holes concentrated toward the tip are characterized by a relatively high steam outflow velocity and higher fiber setting capability by those plate areas which are not apertured and are, therefore, hotter.

It will be recognized, therefore, that before one buys an iron, one should decide on its primary intended use and select the most appropriate type of plate. The decision made on purchase is substantially an irrevocable one.

Further, the need arises occasionally to use an iron in two different modes: a first mode of conventional ironing with the iron reasting on and running across a fabric being ironed in order to flatten out any creases by the combined action of heat, steam, and the slight pressure exerted by the operator; a second mode is that of having the fabric fluffed by the sole action of steam.

In the latter case, the iron is held in a substantially upright position and moved nearer the fabric so as to direct the steam jets from the steam delivery holes onto it.

The plates which have their steam delivery holes gathered more toward the tip suit fabric fluffing best because of the steam being delivered at a higher outflow velocity thereby. However, such irons may not be the preferred ones for primary ironing requirements.

The problem underlying this invention is to provide a steam delivery plate for irons which affords an ability to select each time the steam delivery mode, either concentrated or distributed, which suit best the intended purpose.

This problem is solved by a steam delivery plate as indicated being characterized in that said ribs define at least two separate steam delivery chambers, each apertured with a set of said delivery holes, said steam delivery chambers being arranged to communicate with each other through a delivery conduit provided with an on/off valving

means.

Advantageously, said valving means includes a ball-type shutter movable in said conduit between a first or open position corresponding to a substantially horizontal placement of said plate, whereby said chambers are caused to communicate with each other, and a second or closed position corresponding to a substantially vertical placement of said plate, whereby said conduit is shut off.

The features and advantages of this invention will be more clearly apparent from the following detailed description of a preferred, but not exclusive, embodiment thereof, to be read in conjunction with the accompanying illustrative drawings, where:

Figure 1 is an exploded, longitudinal section view taken on the plane I-I in Figures 2 and 3, showing a steam delivery plate according to this invention;

Figure 2 is a top plan view of a base element for the plate of Figure 1;

Figure 3 is a top plan view of a cover for the plate shown in the preceding Figures;

Figure 4 is a sectional view taken through the cover of Figure 3 along the line IV-IV;

Figure 5 is a bottom plan view of the same cover as shown in the preceding Figures; and

Figure 6 is a bottom plan view of a detail of the plate shown in the preceding Figures.

With reference to the drawing figures, a steam delivery plate 1 for steam irons comprises essentially a base element 2 and a cover 3.

The base element 2 has a substantially flat surface forming the ironing sole piece 4. The sole piece 4 has a substantially triangular shape with arcuate oblique sides 4a, 4b, and a straight base 4c.

The element 2 is provided, on the opposite side from the sole piece 4, with a capping 6 standing proud of a base plane 7. From the plane 7, there extends a first upright rib 8 of continuous closed loop configuration having two sections 8a,b running at a short distance from the oblique sides 4a,b, and a third section 8c running parallel to the base 4c.

A second rib 9 connects to the section 8c which has an inverted "U" configuration; a third rib 10 extends between the sections 8a and 8b.

All the ribs 8, 9 and 10 rise from the base plane 7 to the same height level and are formed at their tops with a groove 11 for accommodating a sealing gasket 12 intervening to form a tight fit between the base element 2 and the cover 3.

Defined between the ribs 8, 9 and 10 on the base element 2, are a steam intake and superheating chamber 15 and two steam delivery chambers, respectively indicated at 16 and 17.

The chamber 16 is located proximate the tip of

the plate 1, whilst the chamber 17 extends around the steam intake chamber 15 horseshoe fashion. All of the above chambers, 15, 16 and 17, have their tops closed by the cover 3.

Inside each of the steam delivery chambers 16, 17, a plurality of elevations 20 are provided which are substantially frustoconical in shape and through-penetrated axially by a steam delivery hole 21. The holes 21 extend through the base element 2 and open into the sole piece 4 with a flaring end.

The cover 3 has a first, essentially flat surface 23 whose outline mates with the upper edge of the rib 8, and is through-penetrated by four holes 24 intended for fastening said cover to the base element 2 by means of screw fasteners, not shown, threadably engaged in seats 25.

From the surface 23 there extend, at the steam intake and superheating chamber 15, a plurality of projections in the form of frustoconical nipples 26 which, with the plate 1 in its assembled state, are enclosed within the aforesaid chamber 15.

Also at the chamber 15, a steam intake conduit 28 is arranged to open through the cover 3.

On the remote side from the surface 23, the cover 3 has an electric resistance heater 30 embedded therein for heating the plate 1. By locating the resistance heater 30 on the cover 3 rather than the base element of the plate, a more uniform distribution of heat across the sole piece 4 can be obtained with no overheated spots on the latter.

In addition, this results in the nipples 26 becoming superheated and acting as heat accumulators to vaporize any water droplets formed within the chamber 15 and avoid their being ejected out of the delivery holes 21. This effect can be made most effective by arranging the nipples at short short distances and offset from one another.

Secured between the legs of the resistance heater 30 are a captive screw 31 and an abutment peg 32 for mounting a thermostat. Also provided are tangs 33 for anchoring the plate 1 on a body, not shown, of the iron.

In the vicinity of the tip of the cover 3, there is formed a channel 35 which is closed at the top by a plate 36, with the interposition of a sealing gasket 37. The channel 35 communicates, via passageways 38, with the steam intake chamber 15, and via two respective passageways 39 and 40, with the two delivery chambers 17 and 16. Said channel 35 forms therefore a steam supply conduit to the two delivery chambers 16 and 17.

Formed in the channel 35 at the passageway 39, is a seat 41 adapted to receive a small pillar 42 which extends at right angles from the plate 36. A right-angle bore 43 is formed in that pillar.

The free edge of the bore 43 is flared to provide a detent for a ball shutter 44 which is freely movable in the channel 35 between the passage-

way 40 and the pillar 42. Thus, the pillar 42 and ball 44 form a valving means for shutting off the supply of steam to the chamber 17.

The ironing appliance of this invention operates as follows.

Steam, as generated for example in a separate boiler, is supplied through the intake conduit 28 to the intake and superheating chamber 15. Inside this chamber, any suspended water droplets are further vaporized by the heat stored in the nipples 26.

Through the passageway 38, the steam is led into the delivery conduit formed by the channel 35 and hence, as the plate is held in a horizontal condition, to both delivery chambers, 16 and 17. In fact, under this condition, the ball 44 will be floating inside the channel 35 and leave the bore 43 uncovered and the passage 39 open.

With the plate 1 in a substantially vertical orientation, the ball 44 will abut the pillar 32 and settle on the free edge of the bore 43.

The passageway 39 of the steam delivery conduit is now blocked to shut off the supply of steam to the delivery chamber 17.

Accordingly, steam can only be supplied through the delivery chamber 16 and its respective delivery holes.

By returning the plate 1 to its horizontal orientation, the ball 44 will uncover the bore 43 if the supply of steam to the plate is interrupted. Otherwise, if the supply of steam is maintained, the steam pressure holds the ball 44 engaged with the free edge of the bore 43, and the steam, even with the plate horizontal, will be only supplied through the holes provided in the delivery chamber 16.

It has been found preferable to provide said chamber 16 with a smaller number of steam delivery holes than the number of the corresponding holes provided in the delivery chamber 17. This expedient has been adopted to both increase the steam outflow velocity through the delivery holes during the steaming operation and to permit ironing with the delivery of steam concentrated around the plate tip.

The plate of this invention affords several advantages over conventional plates. Firstly, the possibility has been significantly enhanced of using an ironing appliance equipped with this plate for steaming operations. Secondly, the sole piece of the plate according to the invention is at a uniformly distributed temperature as achieved by mounting the resistance heater on the cover.

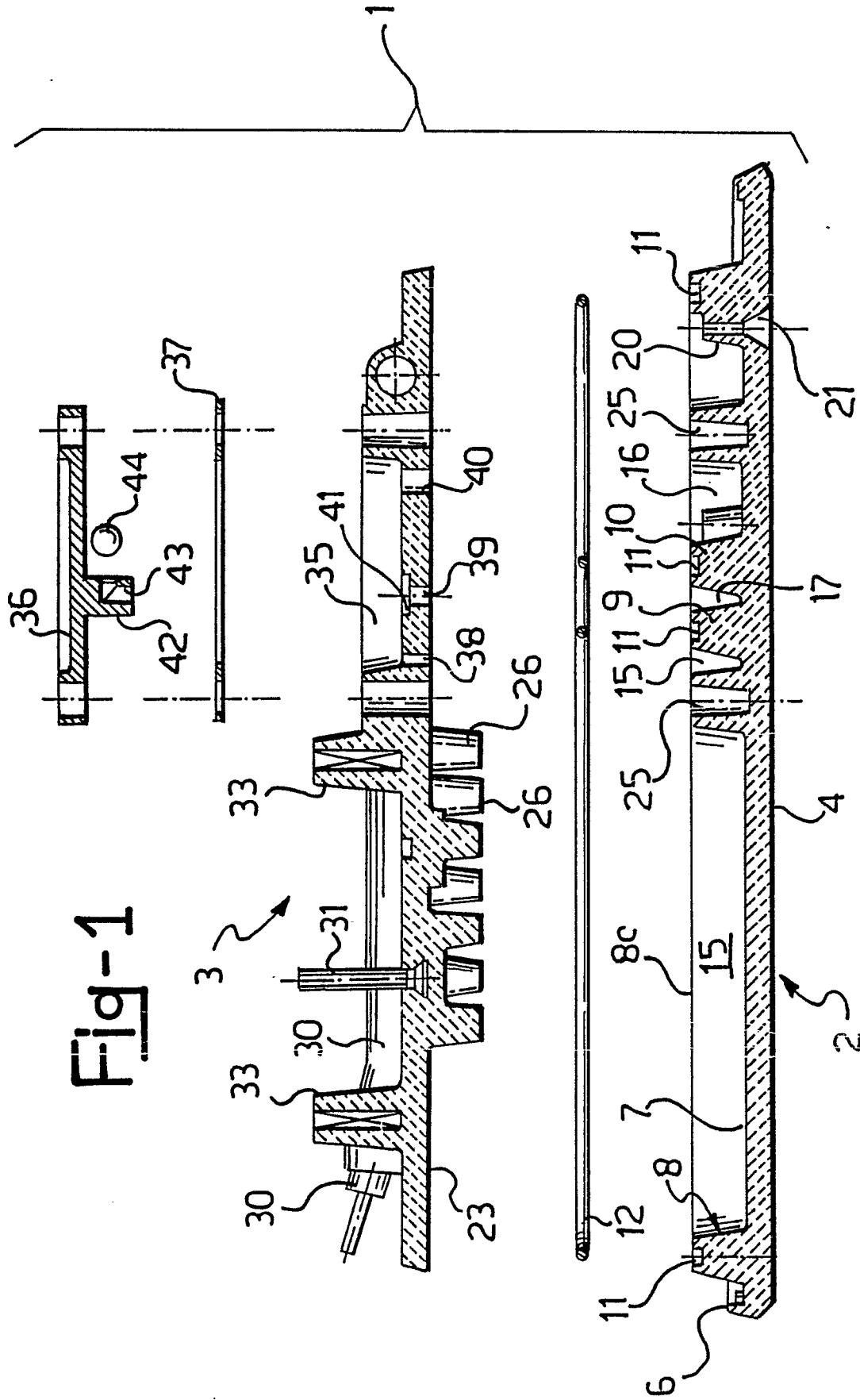
Further, this plate can deliver steam which is almost free of any suspended water droplets.

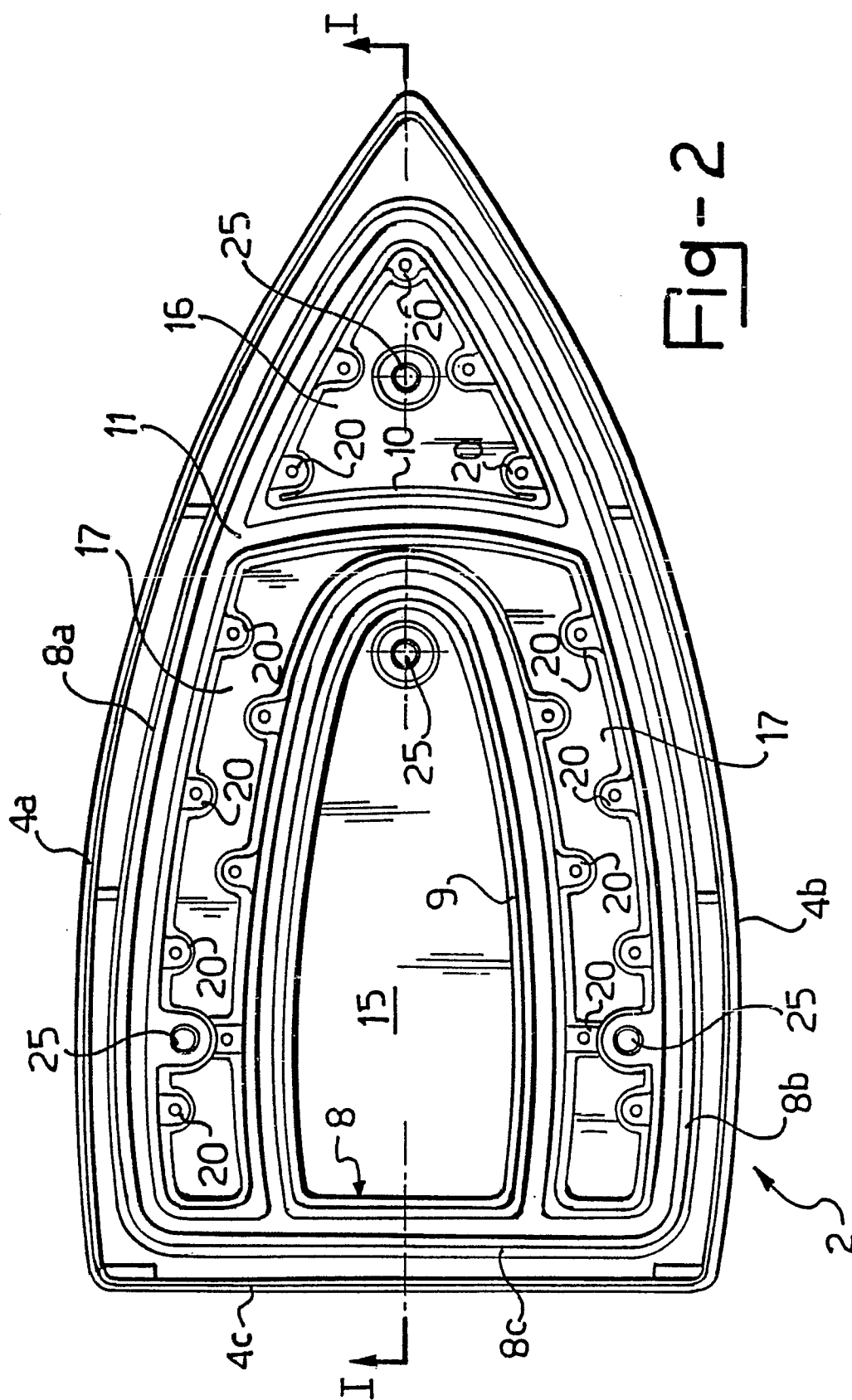
Understandably, the steam delivery plate disclosed hereinabove is equally effective when supplied with steam from a separate boiler, and with water for in situ generation of steam.

Claims

1. A steam delivery plate for a steam iron comprising an electric resistance heater (30), a sole piece (4) apertured with a number of steam delivery holes ((21), a plurality of ribs (8,9,10) standing on the opposite side from said sole piece (4), and a cover (3) in tight relationship with said ribs (8,9,10) bounding steam chambers and circulation conduits in cooperation therewith, characterized in that said ribs define at least two separate steam delivery chambers (16,17), each apertured with a set of said delivery holes (21), said steam delivery chambers (16,17) being arranged to communicate with each other through a delivery conduit (35) provided with an on/off valving means (44). 5 10 15
2. A steam delivery plate according to Claim 1, characterized in that said valving means comprises a ball shutter (44) movable in said conduit (35) between a first or open position corresponding to a substantially horizontal lay of said plate, whereby said chambers (16,17) are communicated with each other, and a second or closed position corresponding to a substantially vertical lay of said plate, whereby said conduit (35) is shut off. 20 25
3. A steam delivery plate according to either Claim 1 or 2, characterized in that said resistance heater (30) is associated with the cover (3).
4. A steam delivery plate according to Claim 3, characterized in that said ribs define on said plate a steam intake and superheating chamber enclosing a plurality of projections (26) affixed to said cover (3) and forming heat accumulators. 30
5. A steam delivery plate according to Claim 4, characterized in that said projections (26) are in the form of frustoconical nipples. 35
6. A steam delivery plate according to one or more of the preceding claims, characterized in that said steam delivery holes (21) extend through corresponding elevations (20) upstanding in the respective chambers along a direction toward said cover (3). 40
7. A steam delivery plate according to one or more of the preceding claims, characterized in that said steam delivery chambers (16,17) have different numbers of steam delivery holes (21). 45
8. A steam delivery plate according to Claim 7, characterized in that the chamber (16) with a smaller number of steam delivery holes (21) is located proximate the tip of said plate. 50

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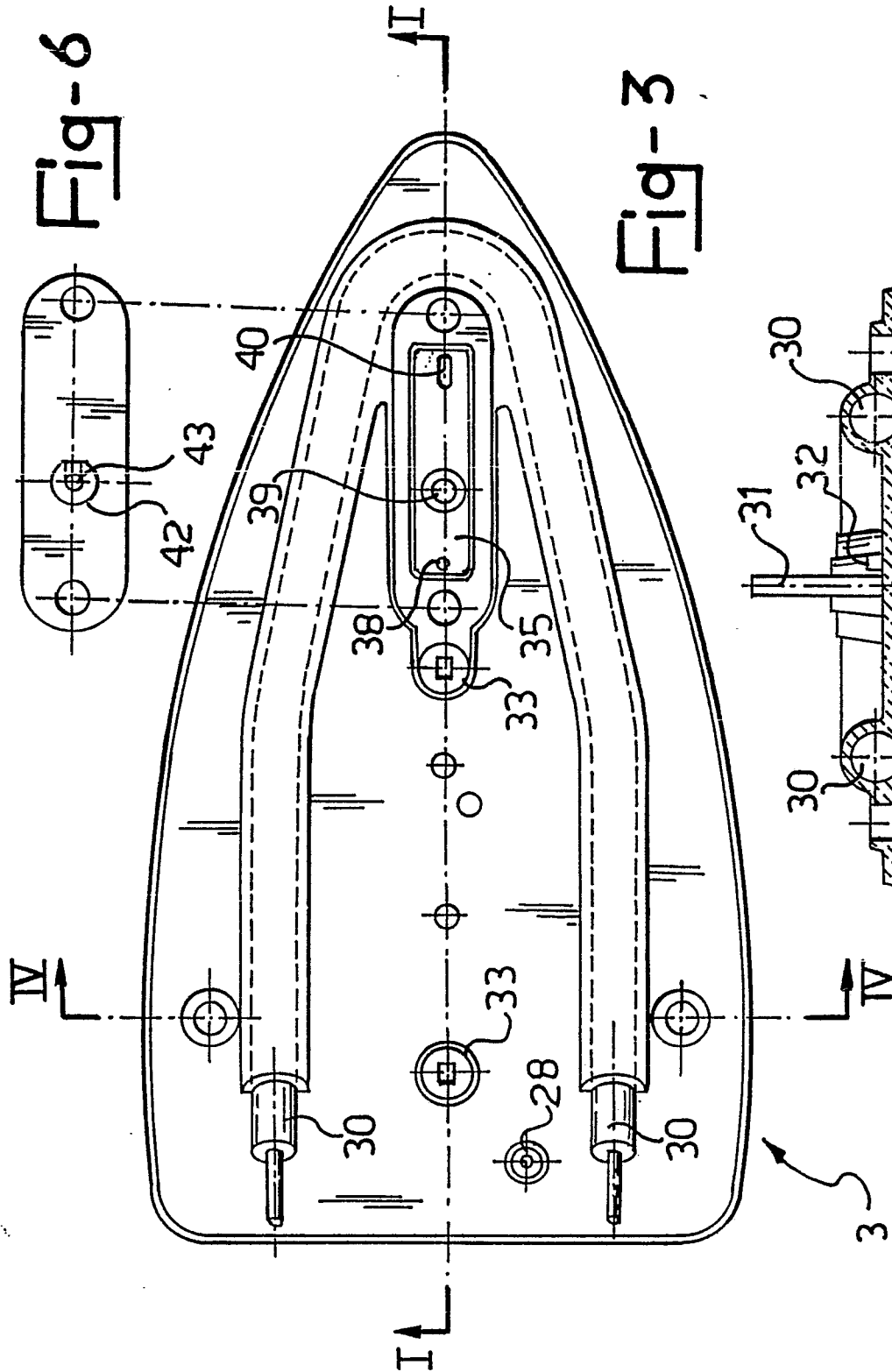


Fig-6

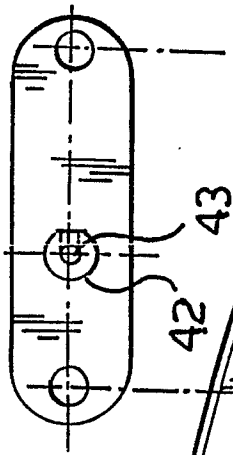


Fig-3

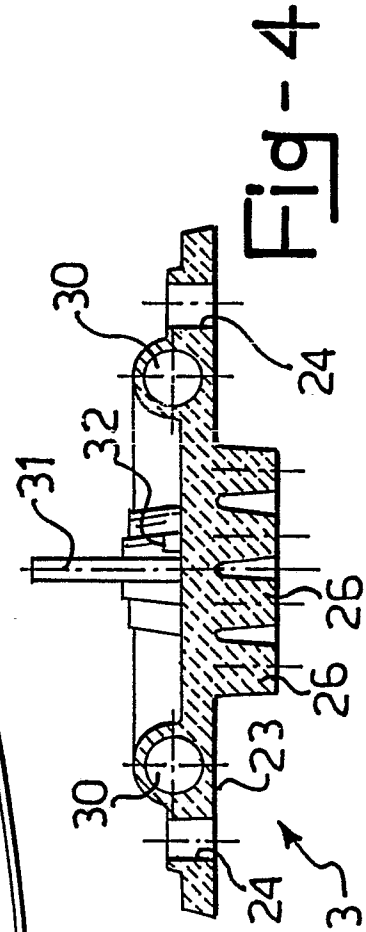


Fig-4

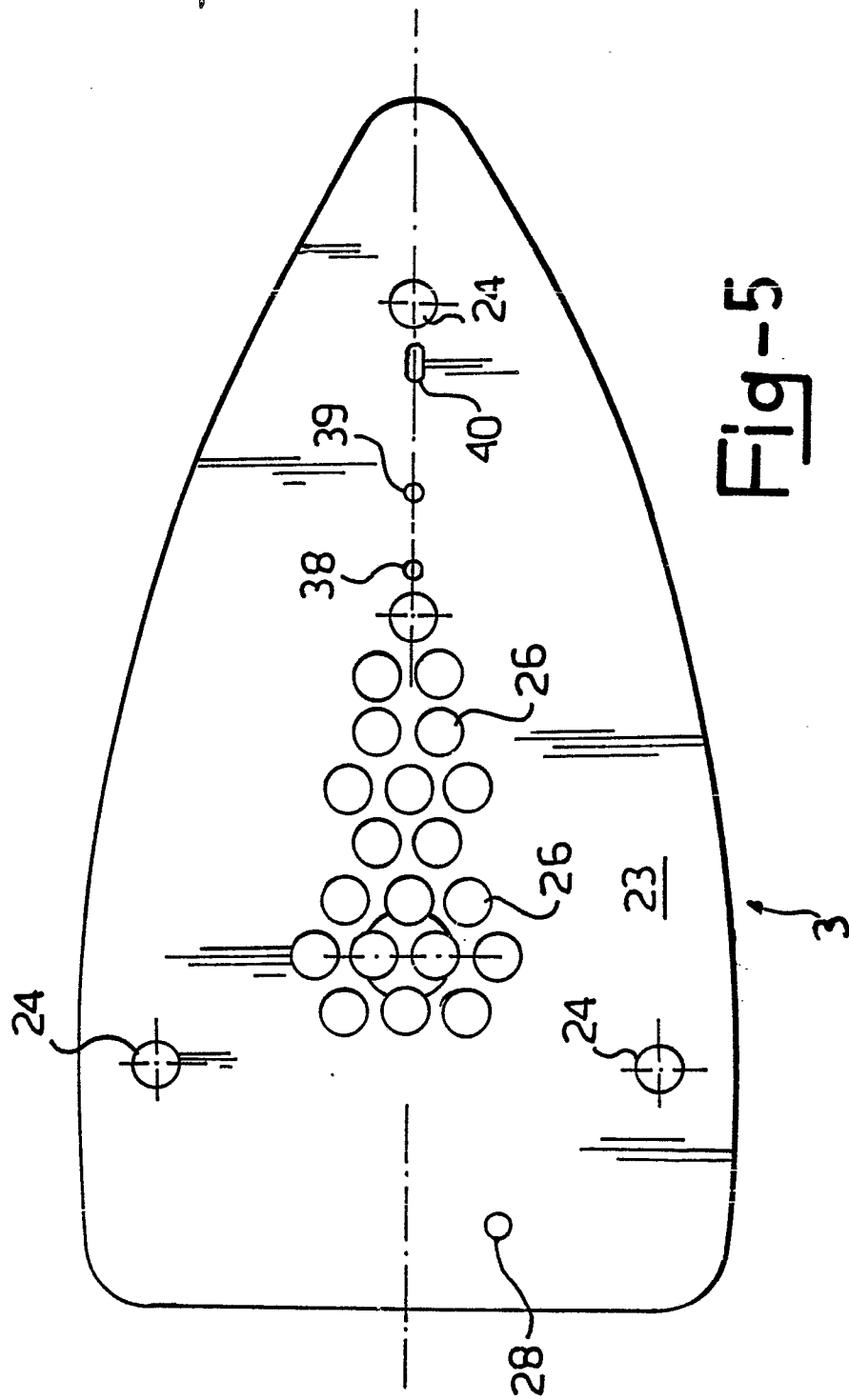


Fig-5



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EUROPEAN SEARCH REPORT

Application Number

EP 88 83 0229

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	FR-A-2490255 (ROBERT KRUPS STIFTUNG) * the whole document * ---	1, 7-8	D06F75/20 D06F75/38
Y	US-A-2425598 (CLUM) * column 4, line 61 - column 6, line 11 * -----	1, 7-8	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			D06F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 JANUARY 1989	Examiner RAYBOULD B.D.J.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document			